Claims

[c1] 1.A method for optical-light scanning of a specimen with a scanning microscope, comprises the steps of:
providing a focused light beam,
scanning the focused light beam across a specimen region (3) thereby defining a current focus position (2); and
regulating the intensity of the light beam, by determining a function of the current focus position (2) in the specimen region (3) of the scanned, focused light beam.

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[c2] 2.The method as defined in Claim 1, characterized in that the step of regulating the intensity of the light beam is accomplished as a function of the current axial focus position.

[c3] 3.The method as defined in Claim 1, characterized in that the step of regulating the intensity of the light beam is accomplished as a function of the current lateral focus position.

[c4] 4.The method as defined in Claim 1, characterized in that the focus positions in a specimen region that is defined by an user.

[c5] 5.The method as defined in Claim 1, comprises the steps of:
mounting the on a mounting medium defining a refractive index and
regulating the intensity of the light beam by taking the refractive index of the specimen's mounting medium into account.

[c6] 6.The method as defined in Claim 1, characterized in that light intensity regulation is accomplished in conjunction with an expert system implemented in a control computer of the scanning microscope.

[c7] 7.The method as defined in Claim 1, comprises the step of: recording and visualizing data, thereby taking information into account concerning light intensity regulation during the recording of data.

[c8] 8.The method as defined in Claim 7, characterized in that a computer

restoration method or a digital reconstruction method is implemented and the information regarding light intensity regulation during data recording is taken into account in the computer restoration method or the digital reconstruction method.

[c9] 9.The method as defined in Claim 1, characterized in that the scanning microscope (1) defines a beam path (7, 8) and an active optical element (9) is positioned in said beam path (7, 8) to accomplish light intensity regulation.

[c10] 10.The method as defined in Claim 9, characterized in that the active optical element (9) consists essentially of an acousto-optical modulator (AOM), an acousto-optical tunable filter (AOTF) and an acousto-optical deflector (AOD).

[c11] 11.The method as defined in Claim 9, characterized in that light intensity regulation is accomplished with a passive optical element (9) arranged in the beam path (7, 8) of the scanning microscope (1).

[c12] 12.The method as defined in Claim 11, characterized in that a neutral density filter disk is used as the passive optical element (9).

[c13] 13.The method as defined in Claim 1, characterized in that a light source (10) generates the light beam and the light intensity regulation is accomplished at the light source (10).

[c14] 14.The method as defined in the Claims 6, characterized in that the control computer (11) of the scanning microscope (1) activates the active, passive element (9) and the light source (10).

[c15] 15.The method as defined in Claim 1, characterized in that a transmission detection apparatus (13) is provided in the scanning microscope (1), the transmission detection apparatus (13) is adapted, as a function of the current focus position (2) in the specimen region of the scanned, focused light beam, in such a way that a maximum signal yield is detectable with the transmission detection apparatus (13).

[c16] 16.The method as defined in Claim 15, characterized in that the

transmission detection apparatus comprises a lens system, and the lens system of the transmission detection apparatus is correspondingly adapted as a function of the current axial focus position (2).

[c17] 17.The method as defined in Claim 16, characterized in that adaptation is accomplished by positioning the lens system of the transmission detection apparatus (13) in the axial direction.

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[c18] 18.The method as defined in Claim 16, characterized in that adaptation is accomplished by changing the magnification of the lens system of the transmission detection apparatus (13).

[c19] 19.The method as defined Claims 16, characterized in that a transmission detector is attached to the transmission detection apparatus (13) and the transmission detector of the transmission detection apparatus (13) is correspondingly adapted as a function of the current focus position (2).

[c20] 20.The method as defined in Claim 19, characterized in that adaptation is accomplished by positioning the transmission detector of the transmission detection apparatus (13) in the axial direction.

[c21] 21.A scanning microscope for scanning a specimen comprising:
a light source generating a focused light beam,
means for scanning the focused light beam across a specimen region (3) thereby defining a current focus position (2), and
means for regulating the intensity of the light beam, by determining a function of the current focus position (2) in the specimen region (3) of the scanned, focused light beam.

[c22] 22.The scanning microscope as defined in Claim 21, characterized in that the means for regulating the intensity of the light beam incorporate means for regulating the intensity of the light beam as a function of the current axial focus position.

[c23] 23.The scanning microscope as defined in Claim 21, characterized in that

the means for regulating the intensity of the light beam incorporate means for regulating the intensity of the light beam as a function of the current lateral focus position.

[c24] 24.The scanning microscope as defined in Claim 21, characterized in that means are provided that the focus positions in a specimen region is defined by an user.

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[c25] 25.The scanning microscope as defined in Claim 21, characterized in that a control computer is provided with the scanning microscope and an expert system is implemented the control computer for performing the light intensity regulation.

[c26] 26.The scanning microscope as defined in Claim 21, comprises means for recording and visualizing data, and the means for recording and visualizing data take information into account concerning light intensity regulation during the recording of data.

[c27] 27.The scanning microscope as defined in Claim 21, characterized in that the scanning microscope (1) defines a beam path (7, 8) and an active optical element (9) is positioned in said beam path (7, 8) to accomplish light intensity regulation.

[c28] 28.The scanning microscope as defined in Claim 27, characterized in that the active optical element (9) consists essentially of an acousto-optical modulator (AOM), an acousto-optical tunable filter (AOTF) and an acousto-optical deflector (AOD).

[c29] 29.The scanning microscope as defined in Claim 27, characterized in that light intensity regulation is accomplished with a passive optical element (9) arranged in the beam path (7, 8) of the scanning microscope (1).

[c30] 30.The scanning microscope as defined in Claim 29, characterized in that a neutral density filter disk is used as the passive optical element (9).

[c31] 31.The scanning microscope as defined in Claim 21, characterized in that

the light intensity regulation is accomplished at the light source (10).

[c32] 32.The scanning microscope as defined in the Claims 27, characterized in that the control computer (11) of the scanning microscope (1) activates the active, passive element (9) and the light source (10).

[c33] 33.The scanning microscope as defined in Claim 21, characterized in that a transmission detection apparatus (13) is provided in the scanning microscope (1), the transmission detection apparatus (13) is adapted, as a function of the current focus position (2) in the specimen region of the scanned, focused light beam, in such a way that a maximum signal yield is detectable with the transmission detection apparatus (13).

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[c34] 34.The scanning microscope as defined in Claim 33, characterized in that the transmission detection apparatus comprises a lens system, and the lens system of the transmission detection apparatus is correspondingly adapted as a function of the current axial focus position (2).

[c35] 35.The scanning microscope as defined in Claim 34, characterized in that adaptation is accomplished by positioning the lens system of the transmission detection apparatus (13) in the axial direction.

[c36] 36.The scanning microscope as defined in Claim 34, characterized in that adaptation is accomplished by changing the magnification of the lens system of the transmission detection apparatus (13).

[c37] 37.The scanning microscope as defined Claims 34, characterized in that a transmission detector is attached to the transmission detection apparatus (13) and the transmission detector of the transmission detection apparatus (13) is correspondingly adapted as a function of the current focus position (2).

[c38] 38.The scanning microscope as defined in Claim 37, characterized in that adaptation is accomplished by positioning the transmission detector of the transmission detection apparatus (13) in the axial direction.

[c39] 39.The scanning microscope as defined in Claim 21, characterized in that fluorescing specimens are excited with a one-photon excitation process.

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[c40] 40.The scanning microscope as defined in Claim 21, characterized in that fluorescing specimens are excited with a two-photon excitation process.

[c41] 41.The scanning microscope as defined in Claim 21, characterized in that fluorescing specimens can be excited with a multi-photon excitation process.